Passiflora tarminiana, a New Cultivated Species of *Passiflora* subgenus *Tacsonia* (Passifloraceae)

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ABSTRACT. The new species *Passiflora tarminiana* differs from its closest relative by the character combination of very small acicular stipules and large reflexed petals and sepals. This species has escaped detection despite being widely cultivated in South America. Naturalized populations, particularly in Hawai'i, have created problems for conservation of the native flora. In Colombia it is more frequently adopted in industrial cultivation because of its unusual vigor and resistance to fungal diseases.

RESUMEN. La nueva especie *Passiflora tarminiana* difiere de su pariente más cercano por la combinación de caracteres de las estípulas aciculares muy pequeñas y los pétalos y sépalos grandes y reflexos. Esta especie ha escapado su descubrimiento a pesar de estar extensamente cultivada en América del Sur. Las poblaciones naturalizadas, particularmente en Hawai, han creado problemas para la conservación de la flora nativa. En Colombia se adopta mas frecuentemente en el cultivo industrial debido a su extremo vigor y resistencia a las enfermedades causadas por hongos.

Key words: Hawaii, *Passiflora*, Passifloraceae, South America, tropical fruit.

Passifloras of the subgenus *Tacsonia* are cultivated by many small farmers, from Venezuela to Bolivia. Some species are cultivated in New Zealand (Young, 1970). The main cultivated species was earlier known as *Passiflora mollissima* (Kunth) Bailey (Escobar, 1980, 1988; Jaramillo, 1957), but which we now prefer to recognize as *P. tripartita* var. *mollissima* (Kunth) Holm-Nielsen & P. Jørgensen as supported by analysis of morphological (Holm-Nielsen et al., 1988; Villacis et al., 1998) and genetic character states (Fajardo et al., 1998; Sánchez et al., 1999). It is called "curuba de Castilla" in Colombia, "tacso de Castilla" in Ecuador, and "banana passion fruit" in English-speaking countries. The second species of importance in the Andes is "curuba india," "curuba ecuatoriana," or "curuba quiteña" in Colombia, called "tacso amarillo" in Ecuador (Pérez Arbeláez, 1978; A.A.A., 1992; Campos, 1992), and "banana liliko'i" or "banana poka" where introduced in Hawai'i (La Rosa, 1984). It is most frequently found in private gardens, but some commercial growers have, because of its wild-type vigor, started to grow it instead of the "curuba de Castilla," *P. tripartita* var. *mollissima*. We describe this overlooked cultigen as a new species under the name *Passiflora tarminiana*, in recognition of Tarmín Campos (b. 1947), a Colombian agronomist and professor who has contributed enthusiastically for the past 20 years to the development of banana passion fruit cultivation and introduced the first author to the cultivated passifloras of the central Colombian highlands.

Producers and consumers easily differentiate *Passiflora tarminiana* from *P. tripartita* var. *mollissima*, but it has never been mentioned as a distinct species in taxonomical studies. In a letter to Tarmín Campos, Linda de Escobar considered it to be a hybrid of *P. tripartita* var. *mollissima*, possibly with the relatively glabrous *P. cumbalensis* (H. Karsten) Harms (in litt., 28 June 1990). The monographer Killip usually referred it to *P. mollissima*, but occasionally annotated specimens (e.g., *MacDaniels 635*) as "a hybrid between *P. mollissima* and some other species of the *Tacsonia* group." Green (1972: 556) suggested that it be "best treated as a part of the variable *P. mixta* [complex]." The new species has been described as a cultivar in Hawai'i, *P. mollissima* 'Banana Poka' (Grierson & Green, 1996). They considered it a probable hybrid, suggesting that it is not *P. mollissima* but that "it now seems probable that it arose in the wild by introgressive hybridization between this species and some other" (Grierson & Green, 1996: 92–93, pl.). We have observed *P. tarminiana* almost everywhere in the Colombian highlands, as well as in the Andes of Venezuela, southern Ecuador, and Peru, consistently with distinct phenotypic traits (see Table 1). Plants grown from seeds show no segregation for these phenotypic traits, which would not be the case with a hybrid. Recent morphological and

Table 1. Morphological comparison of three common or cultivated species of *Passiflora* subg. *Tacsonia*. Lettered numbers refer to the *R.H.S. Colour Chart* (1966).

	P. tarminiana	*P. tripartita*	*P. mixta*
Stem	Terete	Terete	Sub 5-angular
Leaf pubescence	Absent or nearly so on upper surface, moderate on lower surface	Var. *mollissima*: dense on both sides; other varieties: variable, often glabrous at least on upper surface	Absent on upper surface, often absent to rarely dense on lower surface
Stipules	Small (4–7 mm long, 2–3 mm wide), subreniform, denticulate or serrulate, deciduous	Medium (6–12 mm long, 13–19 mm wide), reniform, serrulate to serrate, persistent	Medium to large (6–20 mm long, 12–30 mm wide), reniform, dentate or serrate, persistent
Peduncle	Slender, variable in length, flower pendent	Slender, short, flower pendent	Stout, variable in length, flower half-pendent to erect
Bracts	United ½ their length or more	United ½ their length or more	United ¾ their length or more
Corolla color	Light pink (red-purple group, 57D, 66D, 74D, 75A/B/C), very rarely white	Pink to magenta (red-purple group, 57C/D, 62A, 65A, 66C–D, 68B, 70D for var. *mollissima*, 53B for var. *azuayensis* Holm-Nielsen & Jørgensen, 58B for var. *tripartita*)	Light pink to bright red (most often red/orange-red group, 39A, 42A, 50A, 51B, 52B, 54A, 54B, 55A, also red-purple group in southern Colombia and Ecuador, 63C/D, 75B)
Corolla shape	Corolla reflexed	Corolla campanulate	Corolla campanulate
Floral tube/sepal ratio	Tube/sepal length ratio ca. 1.3–1.6	Tube/sepal length ratio ca. 2.4–3.2	Tube/sepal length ratio ca. 1.6–2.6
Nectary chamber	Appreciably wider than floral tube	Slightly wider than floral tube	Slightly wider than floral tube
Fruits	Pericarp yellow, sometimes orange-tinged; arils orange, succulent	Pericarp pale yellow (var. *mollissima*) to yellow (var. *tripartita*); arils orange, succulent	Pericarp often green at maturity, sometimes turning yellow; arils gray to orange, scant

isozyme studies have confirmed that *P. tarminiana* is distinct from other common species of subgenus *Tacsonia*, such as *P. tripartita* var. *mollissima*, *P. mixta* L.f., *P. cumbalensis*, and *P. pinnatistipula* Cavanilles (Segura et al., 1998; Villacis et al., 1998).

Passiflora tarminiana Coppens & Barney, sp. nov. TYPE: Colombia. Valle del Cauca: Tenerife (municipio El Cerrito), under cultivation, 2200–2600 m, 3°43.189′N, 76°04.482′W, 8 Mar. 1999, *Coppens IPGRI-AM 72* (holotype, COL; isotypes, AAU, AK, BISH, CUZ, GOET, HUA, *IPGRI*, K, MEXU, MO, MYF, QCA, QCNE, TEX, US, VALLE, VEN). Figures 1–3. Table 1.

Passiflora mollissima (Kunth) L. H. Bailey cv. 'Banana Poka' Anon., in Grierson & Green, Hawaiian Florilegium, pp. 92–93, pl. 1996.

Haec species a *P. tripartita* var. *mollissima* (Kunth) Holm-Nielsen & P. Jørgensen sepalis et petalis longioribus perpendicularibus vel reflexis; loculo nectarifero majore; stipulis minoribus acicularibus distinguitur.

Liana, stem cylindrical, bark fibrous; internodes 6–12 cm long; indument canescent, soft to the touch. Stipules acicular, auricular, and aristate, 4–7 × 2(–3) mm (1–3 mm long without the aristate apex), arista 3–4 mm long, early deciduous. Petioles 1.5–4 cm, slightly caniculate adaxially, canescent-ferruginous pubescent with 1 to 4 pairs of adaxial glands. Leaves trilobed, (7–)16(–29) cm wide; lobes ovate, acuminate; margin serrate, central lobe (5.5–)11(–16) × (2.5–)5(–8) cm, lateral lobes (5–)9(–16) × (2.3–)4(–7) cm; lamina moderately lustrous above, glabrescent or scarcely pubescent, trichomes mostly short, mixed with some very long; undersurface canescent-pubescent, the trichomes ferruginous along the nerves. Flowers axillary, solitary, pendent; peduncles 3–10 cm, canescent-pubescent; bracts 3–5 × 2–3 cm, united

halfway, margins entire, ovate, acuminate, nerves yellowish, reticulate venation visible, located 1 cm from hypanthium base; floral tube (including hypanthium) 6–8 × 0.7–1 cm, light green outside, whitish inside; nectar chamber semiglobose, 1.4–2 cm wide; operculum reflexed, margin recurved; annulus present; sepals and petals bright pink to light pink, generally 64D or 75A in the *R.H.S. Colour Chart* (1966), one white sport seen, opening perpendicular at anthesis, then becoming reflexed later in the day or on the second day; sepals 4.5–6 × 1.2–2.5 cm, oblong, aristate subterminally, awn 3–4 mm; petals 3–6 mm shorter than the sepals; floral tube/sepal length ratio 1.3–1.6; corona reduced to a tuberculate ring at mouth of floral tube, white with purple base; androgynophore 7–10 cm, white; free staminal filaments 2 cm, white; anthers yellow; ovary fusiform, green, pubescent; styles white, stigmas green. Fruit 10–14 × 3.5–4.5 cm, fusiform; young fruits canescent, the pericarp dark green with white dots except along the main vascular bundles, the dried styles persistent; during maturation dots disappearing and fruit turning yellow to orange yellow. Seeds asymmetrical, reddish brown when dry, reticulate, acute, cordate; arils orange, sweet, and aromatic.

Figure 2 shows the sites where *P. tarminiana* has been observed or collected in the Andes. Table 1 presents a comparison of *P. tarminiana* with two other similar and common species of the subgenus *Tacsonia*. The most typical traits of *P. tarminiana* are the absent or very reduced pubescence on the upper side of the leaves, the minute stipules that are almost always deciduous, the flower with a smaller floral tube/sepal length ratio, as compared to other similar and common species such as *P. tripartita* (Jussieu) Poiret or *P. mixta*. It is further characterized by reflexed light pink petals, a nectar chamber that is much wider than the floral tube, and a fusiform fruit with small whitish dots that are evenly distributed on the pericarp before maturity, except on the six main vascular strands. In comparison, the other widely cultivated banana passion fruit, *P. tripartita* var. *mollissima*, shows a marked pubescence on both leaf sides, persistent and larger stipules, a bell-shaped corolla, a longer floral tube, and shorter sepals and petals. The fruit of the cultigen *P. tripartita* var. *mollissima* is oblong with round extremities, and uniformly green before maturity (however, *P. tripartita* var. *tripartita* may also show whitish dots on the immature fruit). When both cultigens can be compared in the same orchard, *P. tripartita* var. *mollissima* shows much darker foliage, magenta flowers, and pale yellow mature fruits. The fruits of *P. tarminiana* are of a deeper yellow to orange color, and their pulp is less aromatic and tart. These differences in shape and color make them easy to recognize.

According to the botanical keys of Colombia and Ecuador, *P. tarminiana* would key out to species with broadly ovate-reniform or auriculate and denticulate stipules and pendent peduncles, near *P. cumbalensis* and *P. tripartita* (*P. mollissima* in Escobar, 1988). Our new species can easily be distinguished from either of these species by the size and duration of the stipules and the widening of the nectar chamber. Leaf pubescence is not useful to discriminate *P. tarminiana*, as both *P. cumbalensis* and *P. tripartita* show variation for this trait. In Colombia, because *P. tarminiana* had not been described as a distinct species, and because it is sometimes named "curuba quiteña" or "curuba ecuatoriana," some researchers confused it with *P. tripartita* var. *tripartita*, from Ecuador. This confusion is sometimes found in the "gray literature" (research reports and student theses, e.g., Sañudo & Jurado, 1990).

Confusion with *P. tripartita* var. *mollissima* or with supposed hybrids is frequent in the horticultural, weed science, and fruit culture literature. Pictures of flowers and fruits of *P. tarminiana* are frequently presented as those of *P. tripartita* var. *mollissima* (e.g., Vanderplank, 1996; Ulmer & Ulmer, 1997; Wagner et al., 1999). Sorting out these two species is of special concern to biological control of invasive species programs, where host specificity determines which controls may be used and may have broad implications for conservation policy (see Waage et al., 1981; Chacón & Hernandez, 1981).

As commonly observed in the subgenus *Tacsonia*, *P. tarminiana* hybridizes easily with other species of the subgenus. The hybrids with *P. mollissima* and *P. mixta* are fertile and show intermediate phenotypes (Coppen, pers. obs.). Hybrid seeds have also been obtained with *P. cumbalensis* (J. F. Restrepo, pers. comm.).

Passiflora tarminiana is adapted to a wide range of elevations as compared to other species of subgenus *Tacsonia* growing at tropical latitudes. It may be cultivated from about 2000 m up to more than 3000 m. In comparison, *P. tripartita* var. *mollissima* is not well adapted under 2400 m. As in *P. tripartita* var. *mollissima*, the fruits of *P. tarminiana* grow larger at higher elevations. *Passiflora tarminiana* seems to be more resistant to fungi. La Rosa (1984) reported widespread lesions of *Alternaria* and *Colletotrichum* fungi on the fruits in Hawai'i, but we have never observed conidia on its leaves or a sig-

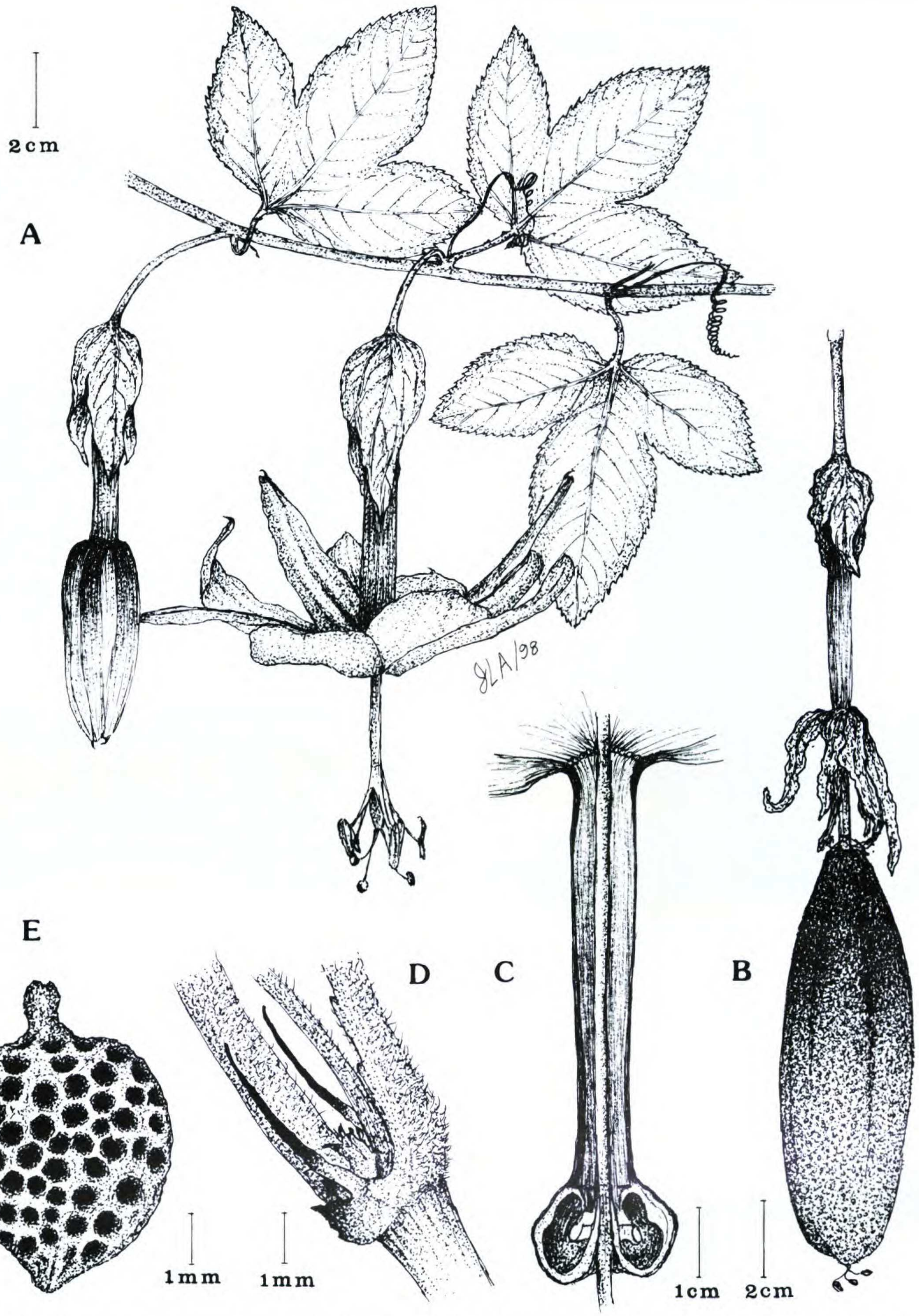

Figure 1. *Passiflora tarminiana* Coppens & Barney. —A. Habit with bud and flower at anthesis. —B. Fruit. —C. Longitudinal section of hypanthium and floral tube showing nectary chamber, operculum, and reduced corona. —D. Node showing stipules. —E. Seed. All drawn from the plants of the type collection.

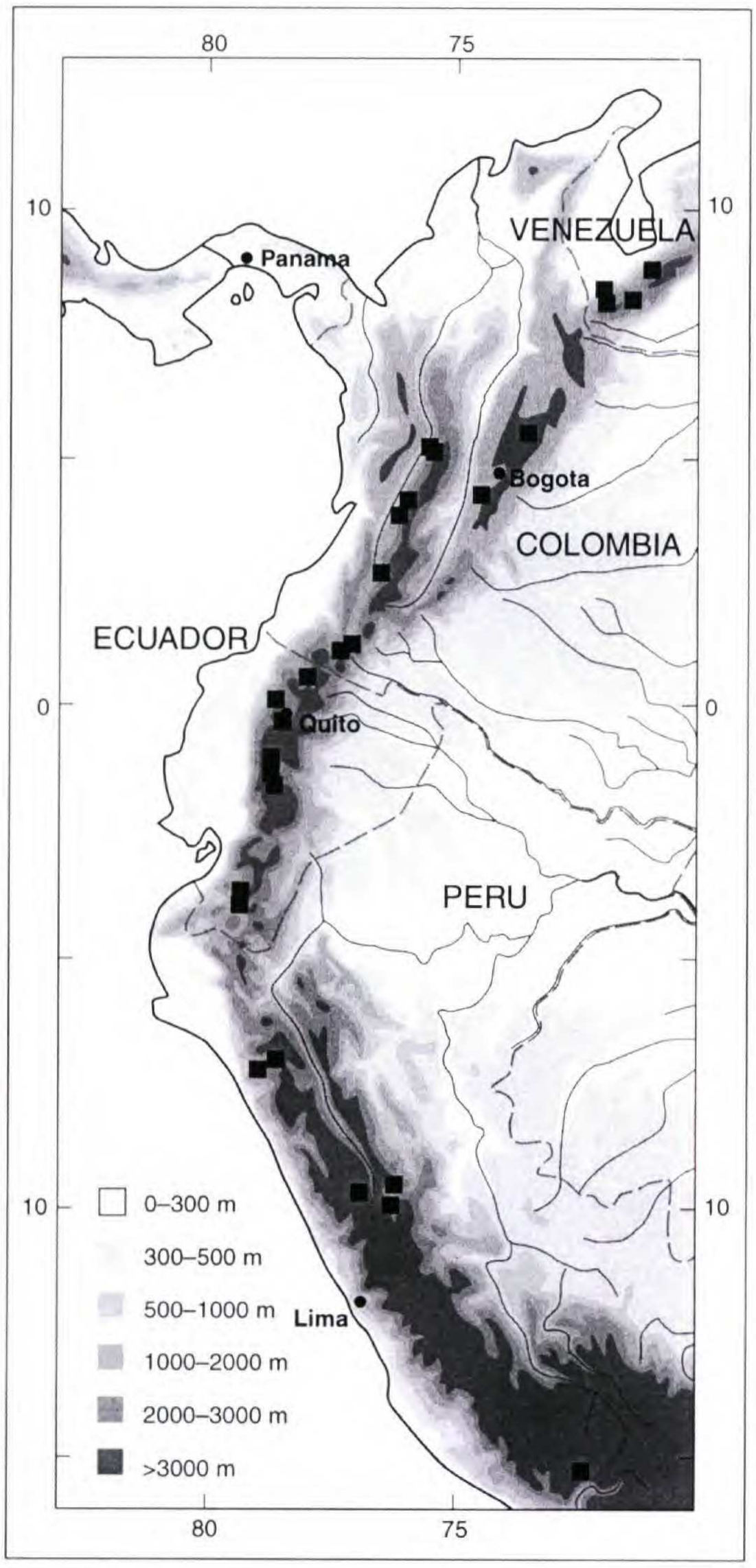

Figure 2. Distribution of *Passiflora tarminiana* in northwestern South America. Squares represent collections.

nificant number of anthracnose necrotic spots on its fruits in South America. On the contrary, the pericarp of *P. tripartita* var. *mollissima* fruits is often affected by anthracnosis, which reduces its market value despite its superior taste. In Venezuela, *P. tripartita* var. *mollissima* has shown high susceptibility to fusarium blight while *P. tarminiana* appeared tolerant or resistant (E. González, pers. comm.). The adaptive potential and rustic nature of *P. tarminiana* have probably been key factors in its conquest of new habitats in New Zealand and Hawai'i where it is reported as a noxious weed (La Rosa, 1984).

Villacis et al. (1998) studied morphological variation in an Ecuadorian field collection including the most common species of subgenus *Tacsonia*. The cluster analyses based on both quantitative and qualitative morphological data clearly separated accessions of *P. tarminiana* from the other species. *Passiflora tarminiana* appeared closer to *P. tripartita* var. *mollissima* and *P. mixta* than to *P. cumbalensis* and *P. pinnatistipula* Cavanilles. Similarly, using six isozyme systems, Segura et al. (1998) showed that *P. tarminiana* is clearly separated from *P. tripartita* var. *mollissima*, *P. mixta*, and *P. cumbalensis*, while *P. tripartita* var. *mollissima* and *P. mixta* could not be clearly distinguished from each other. In a study by Fajardo et al. (1998) with RAPD markers on a sample of 52 plants from 7 subgenera and 14 species of passifloras, 8 plants of *P. tripartita* var. *mollissima* and 5 plants of the species here described (identified in the work as *Passiflora* sp. "india") formed two different subclusters within the subgenus *Tacsonia*. Three of these five plants of *P. tarminiana* produced the same cpDNA RFLP pattern, distinct from that obtained on cpDNA from *P. tripartita* var. *mollissima* (Sánchez et al., 1999).

The exact geographical origin of the new species is obscure. Throughout its range in South America, its situation is similar to that seen in *P. tripartita* var. *mollisima*: plants are nearly always found cultivated, escaped from cultivation, persistent near human habitation, or at least not far from orchards and roads. Despite numerous years in the field, the senior author has never found a specimen coming from a well-preserved forest or subparamo. Even in disturbed areas, we have not seen the new species forming populations similar to those seen in *P. mixta*. Additional studies should be directed to the southern part of the Andes: the isozyme data for *P. tarminiana* (Segura et al., 1998) show a wider diversity in Ecuador than Colombia or Venezuela, and herbarium specimens from Peru seem slightly more morphologically variable.

Passiflora tarminiana has been introduced into numerous cool tropical and tropical montane areas other than its original Andean range, in some cases becoming an invasive weed. Our examination of exsiccatae documents its spread to California by 1907, to Hawai'i by 1921 (La Rosa, 1984), to Mexico by 1936, to Ethiopia by 1967, to New Guinea by 1972, and to Zimbabwe by 1981. It recently has been introduced to the French island of La Réunion at elevations over 700 m (C. Lavigne, pers. comm.).

Most of the paratypes cited below are in small herbaria not registered with *Index Herbariorum*, and their abbreviations are italicized to distinguish them from approved herbarium acronyms. These abbreviations, *INIA*, *INIAP*, *IPGRI*, and *CIRAD-*

Figure 3. Color photos of the type collection plants, *Coppens IPGRI-AM 72*.—A. Habit of flowers, buds, and immature fruits. —B. Longitudinal section of flower showing interior of floral tube and nectary chamber; extra flap of tissue seen on left wall of nectary chamber is an artifact from sectioning. Bracts have been separated for clarity. —C. Shoot tip showing underside of leaves and distally valvate bracts completely enclosing young buds. —D. Mature fruits, one sectioned to show arils and seeds.

FLHOR/IPGRI, correspond to the following institutions: *INIA*—Instituto Nacional de Investigación Agraria, Perú, Casilla 2791, Lima 1, Peru; *INIAP*—Instituto Nacional de Investigaciones Agropecuarias, Ecuador, C.P. 17-01-340, Quito, Ecuador; *IPGRI*—International Plant Genetic Resources Institute, IPGRI-AM, oficina para las Americas c/o CIAT, A.A. 6713, Cali, Colombia; *CIRAD-FLHOR/IPGRI*—field germplasm collections in Tenerife, Colombia, maintained by CIRAD-FLHOR/IPGRI Project for Neotropical Fruits, address above.

Paratypes. COLOMBIA. **Cauca:** Silvia, *Barney IPGRI-AM-14* (*IPGRI*). **Valle del Cauca:** Barragán, 4°01.52′N, 75°53.54′W, 2900 m, *Coppens & S. Segura IPGRI-AM-3* (*IPGRI*); Tenerife (municipio El Cerrito), under cultivation, 2200–2600 m, 3°43.189′N, 76°04.482′W, same plants as type, *Coppens & Barney IPGRI-AM 2* (*IPGRI*, MO). ECUADOR. **Carchi:** S of Tulcán, 0°30.52′N, 77°54.05′W, 2690 m, *Coppens & Barney IPGRI-AM-13* (*IPGRI*). **Chimborazo:** Volcán Chimborazo, *Barney IPGRI-AM-8* (*IPGRI*); Riobamba, Químiag, 2650 m, *C. Tapia & J. Velásquez CS-070* (*INIAP*). **Loja:** Santiago, 3°47.38′S, 79°17.38′W, 2450 m, *Coppens IPGRI-AM-10* (*IPGRI*); Saraguro, San Lucas, 2550 m, *C. Tapia & E. Morillo CTEM-040* (*INIAP*). **Pichincha:** cultivada, Parroquia Calacali, Reserva Geobotánica Pululahua, 0°05′N, 78°30′W, *Cerón & Cerón 2740* (MO); 0°22′S, 78°25′W, 2650 m, *Coppens & Barney IPGRI-AM-12* (*IPGRI*); Unchibamba, S of Quito, 1°07.85′S, 78°35.32′W, 2610 m, *Coppens & Barney IPGRI-AM-11* (*IPGRI*); Rumiñahui, Iasa, 0°22′S, 78°25′W, 2650 m, *N. Mazón & B. Elizalde NMO-038* (*INIAP*). **Tungurahua:** Ambato, 1°22.02′S, 78°36.21′W, 2500 m, *Barney IPGRI-AM-9* (*IPGRI*); Baños, 2680 m, *Coppens IPGRI-AM-4* (*IPGRI*). PERU. **Arequipa:** Tuhuana, 15°39′06″S, 72°28′09″W, 2545 m, *Ll. Rios, J. Medina & L. López INIA-PRONARGEB 230* (*INIA*). **Cajamarca:** Barrio Santa Elena, 7°17′51″S, 78°51′56″W, 2730 m, *Ll. Rios, J. Medina & L. López INIA-PRONARGEB 170* (*INIA*); alrededores de Guzmango, Prov. Contumazá, 2600–2700 m, *Sagástegui A. 122* (US). **Huánuco:** Chinchao, 9°72′72″S, 76°09′68″W, 2650 m, *Ll. Rios, J. Medina & L. López INIA-PRONARGEB 101* (*INIA*), 2480 m, *Ll. Rios, J. Medina & L. López INIA-PRONARGEB 104* (*INIA*); Soldado Ucro, 9°80′90″S, 76°80′00″W, 3200 m, *Ll. Rios, J. Medina & L. López INIA-PRONARGEB 113* (*INIA*); Conchamarca, 10°03′99″S, 76°20′35″W, 2490 m, *Ll. Rios, J. Medina & L. López INIA-PRONARGEB 116* (*INIA*); La Libertad-Ting, 10°01′56″S, 76°17′00″W, 2820 m, *Ll. Rios, J. Medina & L. López INIA-PRONARGEB 118* (*INIA*); Quiulacocha, 10°01′56″S, 76°17′00″W, 2820 m, *Ll. Rios, J. Medina & L. López INIA-PRONARGEB 120* (*INIA*). VENEZUELA. **Mérida:** Mucuruba, 8°09.46′N, 71°20′W, 2000 m, *E. González & Barney IPGRI-AM-6* (*IPGRI*). **Táchira:** Betania,Villa Paez, 7°31.70′N, 72°26′W, 2000 m, *E. González & Barney IPGRI-AM-5* (*IPGRI*); Pueblo Hondo, 8°15.19′N, 71°53.07′W, 2500 m, *E. González & Barney IPGRI-AM-7* (*IPGRI*).

Representative specimens. ETHIOPIA. Alemaya, cultivated, *Westphal & Westphal-Stevels 494* (MO). MEXICO. **Distrito Federal:** cultivated at El Rosario, *MacDaniels 635* (BH). **Michoacán:** desv. a San José del Rincón carr. Angangeo–Villa Victoria, *Soto & Ramírez 1496* (MEXU, MO). **Morelos:** Mpio. Huitzilac, *H. Hernández 16* (MEXU); Mpio. Huitzilac, 1.2 km de la Carr. Federal Cuernavaca–México, D.F., rumbo a Zempoala, *Luna C. 21* (MEXU, MO). NEW ZEALAND. **North Island:** Mount Albert, *Astridge* (AK-*219103*); Wellington, *Brownsey* (AK-*152731*); Titirangi, *Cameron* (AK-*221386*); Grafton Gully, *Cameron* (AK-*221519*); Waiheke Island, *Cameron 7524* (AK-*229217*); Swanson, *Cameron 9458* (AK-*236385*); Paihia, *Cumber* (AK-*116173*); Mount Albert, *Dingley* (AK-*122719*); Palmerston, *Esler* (AK-*173113*); Mount Albert, *Esler* (AK-*219104*), *Esler* (AK-*219109*); Kerikeri, *Esler* (AK-*219107*); Wood Bay, *Esler* (AK-*219108*); between Nelson City and Whakapuaka, *Healy 74/80* (MO); Waitemata, *Mackinder* (AK-*162676*); Tutukaka and Matapouri, *Newfield* (AK-*212296*); Epsom, *J. Reid* (AK-*116084*); Motuihe, *Sikes* (AK-*220536*); Buller, Karamea, near Karamea, *Sykes 10/85* (MO); Hokianga, *Wright 912* (AK-*138965*); Waitemata, *Wright 1657* (AK-*140997*); Mount Albert, *B. Young* (AK-*114204*), *B. Young* (AK-*114205*), *B. Young* (AK-*116172*), *B. Young* (AK-*117558*); Titirangi, *B. Young* (AK-*116171*), *B. Young* (AK-*117563*); Otahuhu, *G. Young* (AK-*116164*). **South Island:** Port Hills, *Sikes* (AK-*225281*); Punakaiki, *B. Young* (AK-*117584*), *B. Young* (AK-*221387*). PANAMA. **Chiriquí:** carr. hacia la cima del Volcán Barú, *Montenegro 1630* (MO). PAPUA NEW GUINEA. **New Guinea:** Eastern Highlands, Mount Wilhelm near Iwam Pass, *Takeuchi 5898* (MO). U.S.A. **California:** cultivated "in Southern California," *Boughton 242* (US); Golden Gate Park, San Francisco, *Wight 1806* (MO). **Hawaii:** Hwy. 550 along Waimea Canyon, mile 14 near NASA tracking station, *Croat 44833* (MO); Kaua'i, rd. to Kumuwela Lookout, *Crosby & Anderson 1496* (DUKE); Hawai'i, Muana Kea, *Degener et al. 20354* (MO); Kaua'i, near Kokee Ranger Station, *Degener & Degener 35181* (MO); Hawai'i, Puna, Hawai'i Volcano National Park, *Degener & Degener 35183* (MO); Kaua'i, *Henrickson 4034* (NCU); Hawai'i, Puna district, land of Olaa, *D. Horbst* (MYF-*459*); Kaua'i, Waimea District, Na Pali-Kona Forest Reserve, Makaha Valley, *Lorence 5221* (MO); Kaua'i, Pu'u Hinahina Lookout, Waimea Canyon, *Thorne & Zupan 10153* (MO); Hawai'i, Muana Kea road by Douglass Monument, *Trujillo s.n.* (MO); Hawai'i, North Kona, Puuwaawaa, *Webster & Wilbur 1853* (DUKE). ZIMBABWE. Distr. Inyanga, Inyanga Downs, naturalized in Kloof, near sawmill, *Geddes s.n.* (MO).

Numerous germplasm collections of the new species from five departments in Colombia and one in Ecuador are presently maintained at *CIRAD-FLHOR/IPGRI.*

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Table 1. The botanical illustration was executed by Jairo Larahondo Aguilar.

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